

# Long-term dependence in financial prices: Evidence from the Belgian stock market returns

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## Abstract

This article aims to contribute to the discussion of long-term dependence, focusing on the behavior of the main Belgian stock index. Non-parametric analyzes of the general characteristics of temporal frequency show that daily returns are non-ergodic and non-stationary. Therefore, we use the rescaled-range analysis (R/S) and the detrended fluctuation analysis (DFA), under the fractional Brownian motion approach, and we found slight evidence of long-term dependence. These results refute the random walk hypothesis with i.i.d. increments, which is the basis of the EMH in its weak form, and call into question some theoretical modeling of asset pricing. Other more localized complementary study, to identify the evolution of the degree of dependence over time windows, showed that the index has become less persistent from 2010. This may mean a maturing market by the extension of the effects of current financial crisis.

**Keywords:** Long-term dependence; Hurst exponent; Rescaled-range analysis; Detrended fluctuation analysis; Econophysics.

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